COMPARATIVE PLANETOLOGY: TESSERAE, A NEW TYPE OF LANDSCAPE ON EARTHLIKE PLANETS. Heinz-Peter Jöns, Geographisches Institut der Universität Würzburg, Am Hubland, 97074 Würzburg, Germany.

The new geoscientific discipline of comparative planetology provides for the first time the possibility of comparing the origin of entire landscapes and the type(s) of activities that led to their origin/reshaping.

One of the most striking results of a morpho-interpretative analysis of highly fractured areas on the surface of the "classic" Earthlike planets (Venus, Earth, and Mars) is probably the fact that they have—besides volcanogenic features—at least one large-scale type of landscape in common, the tesserae, despite their totally different climate and, hence, their totally different exogenic dynamics.

The relief of the tesserae is characterized by jumbled pot-sherdlike broken remnants of brittle material and countless ridges and valleys. The origin of such a landscape seems to have been in all cases the result of the instability of a weak underlying layer of material that got more or less completely mobilized, which led to the fracturing of the overlying brittle material. When that fractured material started downslope sliding in areas with a considerable relief, the result was a set of festoonlike material accumulations that display in most cases more or less lobate units. In special cases such lobate units got so elongated that they finally look very much like glaciers.

Venus: The origin of the venusian tesserae, the classic tesserae on Earthlike planets is not yet well understood. The problems with these tesserae are caused by the fact that an underlying layer of soft material on Venus is hitherto unknown. However, some 10–15% of the venusian surface displays the relief of tesserae, which form in many cases very elongated glacierlike material accumulations [1,2].

Earth: On Earth tesseralike landscapes come into existence either due to the softening of (an) underlying unit(s) as it happened during the last pluvial era in North Africa along the escarpment of the Djado Plateau [3], or due to the melting of underlying ground ice/permafrost as occurs, for instance, on Spitzbergen/Svalbard.

Mars: On Mars a large-scale tesseralike landscape surrounds the huge shield volcano Olympus Mons. In that case the marginal parts of the original volcanic shield (the so-called Proto Olympus Mons) very probably got fractured due to melting of underlying ground ice and/or permafrost [4]. The radial downslope sliding of the fractured material led to the origin of giant lobate units that show the typical relief of tesserae (countless ridges and valleys). Secondary sliding led in some cases to the origin of somewhat glacierlike structurs [5].

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